gible, and the heat from the combustion of fuel for power and light is likely to be distributed through a considerable layer of air by convection. Thus even though it may affect the depth of snowfall, the city heat has small effects either in ameliorating the coldest weather or in making the hottest weather worse.

A final point may be worth mentioning. The graph of the mean temperatures of winters during the past 50 years shows that each of six of the seven which were more than 3° F. below normal at New York City, was followed by a winter having a temperature above normal and at least 4° above that of the cold winter. The winter just past has been the eighth cold one. Are the chances 6 to 1 that next winter will be warmer than normal?—*Charles F. Brooks.*

ON THE INFLUENCE OF LARGE CITIES ON CLIMATE.

[From abstract in *Prometheus*, Apr. 6, 1918, p. 259.]

It is believed that large cities may effect climate through the following means: (1) Discharging into the air soot, dust, and gases; (2) the rapid removal of precipitation, which would decrease the effects of evaporations; and, (3) increasing of temperature. Wilhelm Schmidt has investigated the warming effect of Vienna, and finds, through a knowledge of the amount of various kinds of fuel used in 1913, that the total heat obtained from burning fuel was 5.3×10^{12} kg. calories. In addition, there is the contribution of animal heat, and he finds that the population of Vienna, 2,130,000, set free 1.56×10^{12} kg. calories in the year. 35,000 horses and 9,500 head of cattle contributed 0.16×10^{12} kg. calories. This gives a total of about 7 billion kilogram-calories for the year, which, compared with the heat received from the sun, amounts to about one-sixth for the area of the city.

For more closely built cities such as Berlin, this value is increased, amounting for Berlin and Potsdam to one-third the heat received from the sun.—*C. L. M.*

WINTER TYPES ON THE BASIS OF FIVE-DAY TEMPERATURE MEANS.

By FRIEDRICH KLENGEL.

[Abstracted from *Meteorologische Zeitschrift*, March–April, 1918, pp. 65–74.]

By analyzing the temperature records of 30 years at Plauen, the author shows how the use of monthly means may give an erroneous impression of the type of winter. Diagrams showing the monthly means during the months November to March, inclusive, and showing the pentad [1] means for several individual winters are compared, and it is found that those winters which stand out as extreme are those which have one or more long periods of extremely cold weather. The winter in which there are alternating periods of cold and warm weather does not give the general impression of a cold one, even though the minima be equally low. The pentad curves show these fluctuations, whereas the monthly means will not. The winter of 1917–18 illustrates this: it was considered the most severe since the winter of 1870–71, but the mean temperature stood seventh in the list of coldest winters.—*C. L. M.*

[1] Attention is invited to Prof. C. F. Marvin's discussion of the week as a convenient subunit for the discussion of annual meteorological data: MONTHLY WEATHER REVIEW, August, 1919, 47: 546.—EDITOR.

ON MILD WINTERS.[1]

By G. HELLMANN.

[Reprinted from *Science Abstracts*, July, 1918, p. 286–287, § 739.]

A measure of the degree of mildness of a winter is obtained by forming the sum of the positive daily means (in degrees centigrade) of temperature from December 1 to the last day of February. [Severe winters were dealt with similarly by taking the negative daily means, see Abs. 624 (1918).] These sums vary in Berlin, in 150 years, 1766 to 1916, between 412 and 22, the mean value being 171. Mild winters are more frequent than severe ones and have a less decided character. In some "mild" winters occur comparatively brief periods of severe frost. The mildest winter experienced in Berlin was that of 1795–96, the mild period of which lasted from December 2 to February 26. No snow fell between November 29 and February 10, a fact which was "without parallel since 1701." Trees burst into leaf at the end of January. The longest mild winters were those of 1821–22 and 1823–24, which lasted from about November 10 to the end of March in both cases.

The following general conclusions are set out: Very mild winters usually commence in November and last till March. The highest temperatures occur most frequently in December and least frequently in January. The highest temperatures to be expected are 14° to 15° C.

(In severe winters the lowest temperatures are about —28° C.) Characteristics of very mild winters are much cloud, high humidity and rainfall, unsettled weather with much wind. Occasionally mild winters are, however, characterized by quiet, foggy weather, with much cloud and little rain. In mild winters the wind generally comes from the west. There is no regularity in the occurrence of mild winters, but they have been much more frequent in Berlin since 1862 than before. In the period 1909–10 to 1915–16, there were 7 winters, of which 5 were very mild and 1 was mild. Hence the comparatively severe winter of 1916–17 was the more remarked upon. After very mild winters there is usually a cold snap in March or April, and a normal or warm summer.—*R. C.*

LONG-RANGE FORECASTS OF JAPAN'S RICE CROP.[2]

By T. OKADA.

[Reprinted from *Nature*, London, Jan. 15, 1920, p. 509.]

In the Bulletin of the Central Meteorological Observatory of Japan (vol. iii, No. 1) Prof. T. Okada attempts to discover a forecasting formula, starting from the undoubted fact that in Japan a hot August means a good crop, and a cold August a bad one, resulting in famine in 1902, 1905, and 1913. Prof. Okada connects the temperature of northern Japan with the sun-spot cycle, but more definitely finds a correlation between the August temperature in that region, the March pressure difference between Zikawei and Miyazaki, and the South American pressure for March to May, using data from Santiago and Buenos Aires. The South American data give larger correlation coefficients (0.5 or 0.6 with P. E. < 0.1) than the Zikawei-Miyazaki pressure differences (0.3 or 0.4 with P. E. > 0.1). Treating the districts of Hokkaido and Tohoku separately, he obtains the yearly variation in the rice crop for the former as $0.53x + 0.26y$, and for the lat-

[1] Preuss. Akad. Wiss. Berlin, Ber. 11, pp. 213–220, 1918.
[2] Bull. of the Central Meteorological Observatory of Japan, vol. 3, No. 1, 1919.

ter as $0.18x+0.10y$, where x is the yearly variation of South American pressure, March to May, and y the yearly variation of pressure gradient, Zikawei-Miyazaki. The table of comparative results shows a fair agreement in sign between calculated and actual yields, especially for Hokkaido, and the conclusion is drawn that, in general, abnormally low pressure in the southern part of South America from March to May and abnormally small pressure gradient in March between Zikawei and Miyazaki are followed by a failure of the rice crop in northern Japan.

RADIO AMATEURS GET WEATHER REPORTS.

An amateur radio operator in North Dakota has written the Weather Bureau, United States Department of Agriculture, that he is daily receiving the weather forecasts sent out by the powerful wireless station at Arlington, Va. In Kansas, according to reports, the State agricultural college is now sending out weather reports by wireless every morning except Sunday, for the benefit of a considerable number of amateurs, many of whom live in the rural districts of that State and so are able to be of service to the farmers in their neighborhoods. No doubt in other parts of the country there are those who are "listening in" on the dispatches sent out by high-powered radio towers.

The sending of the Weather Bureau's forecasts by radio is in charge of the Navy, hence at many points far inland it is improbable that amateurs could pick up the messages. The Weather Bureau has carefully considered the possibilities of further use of the wireless in inland districts, but owing to an arrangement made some years ago whereby the bureau relinquished radio activity in favor of the Army for inland communication and the Navy for coastal work it has not been feasible to extend the forecast service in this manner. However, what the amateur in North Dakota and those in Kansas have been able to do suggests that others might "pick up" the weather reports, thereby securing them considerably in advance of the published reports.—*Weekly News Letter*, U. S. Dept. Agric., Mar. 31, 1920, p. 7.

American stations issuing daily meteorological bulletins are: Arlington, Va. (2,500); Key West, Fla. (2,400); Great Lakes Training Station, Ill. (1,512); North Head, Wash. (600); San Francisco, Calif. (600); and San Diego, Calif. (600). The time of all messages is 10 p. m., 75th meridian time and the wave lengths in meters are given in parentheses for each station.

INTERNATIONAL METEOROLOGICAL RADIO-SENDING STATIONS.

The Supplement to *La Nature* of January 10, 1920, page 9, contains a list of European wireless stations, which have in their daily program certain times for sending meteorological information.

Station.	Wave length (meters).	Time (G. M. T.)
Whitehall, Orkney Islands	2,800	9:30 20:30
Paris, France	2,600	9:45 16:00 21:30
Cleethropes, England	3,000	10:00 22:00
Scheveningen, Netherlands	1,800	11:15
Madrid, Spain	2,000	13:29

It is noted that the times of these messages are subject to change.—*C. L. M.*

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C. F. TALMAN, Professor in Charge of Library.

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